

Aug. 9, 1960

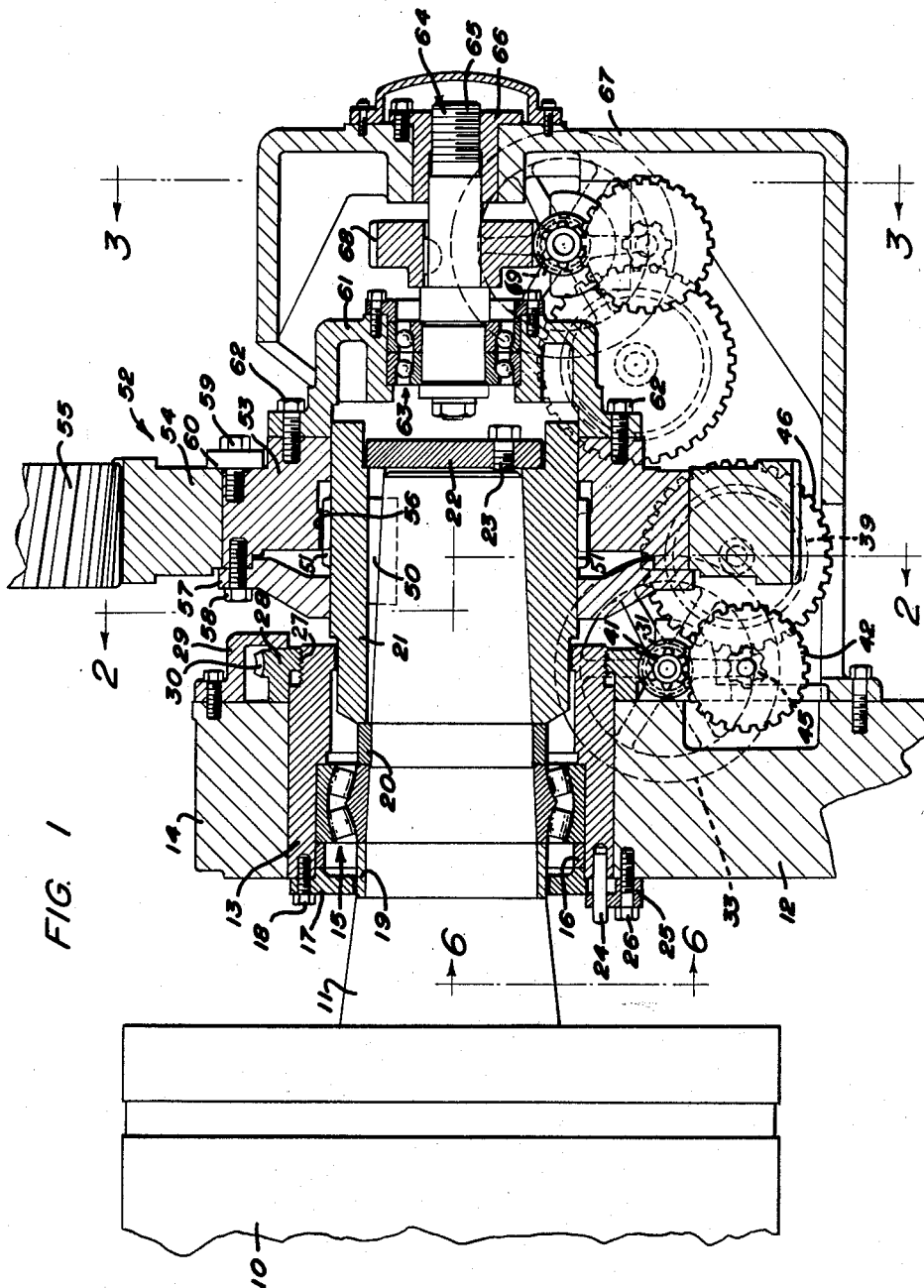
R. H. THOMPSON

2,948,216

PLATE CYLINDER REGISTER MECHANISM

Filed July 28, 1958

3 Sheets-Sheet 1



INVENTOR.

ROBERT H. THOMPSON

BY

William Weigl
AGENT

Aug. 9, 1960

R. H. THOMPSON

2,948,216

PLATE CYLINDER REGISTER MECHANISM

Filed July 28, 1958

3 Sheets-Sheet 2

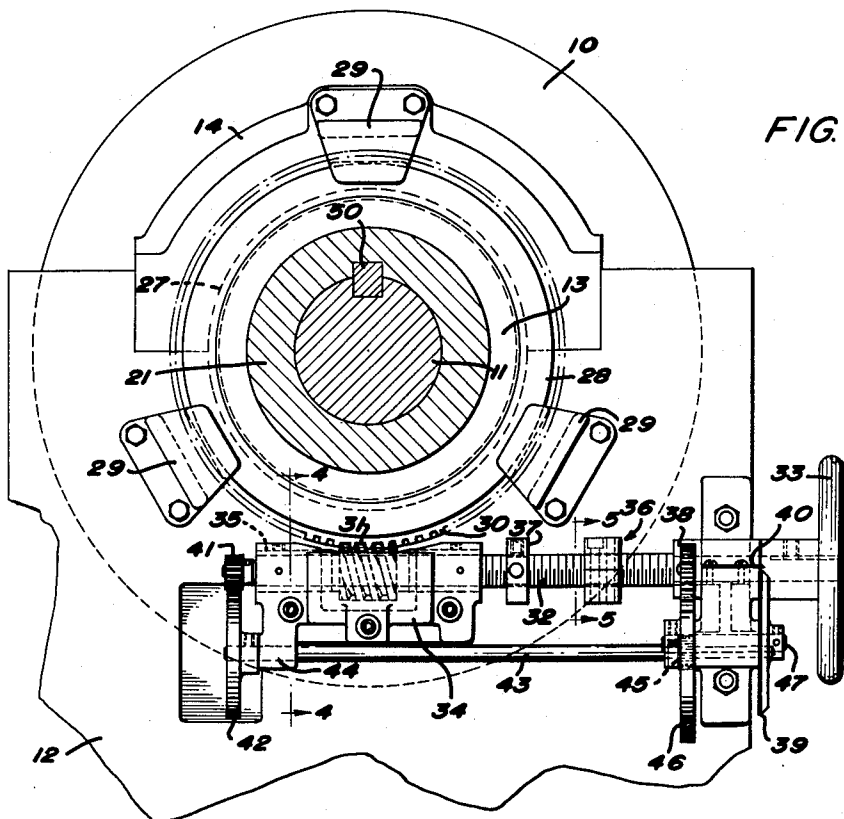


FIG. 2

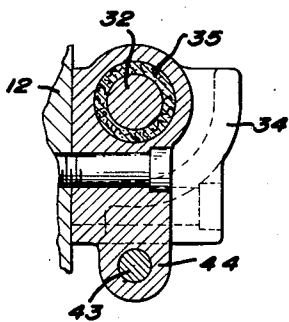


FIG. 4

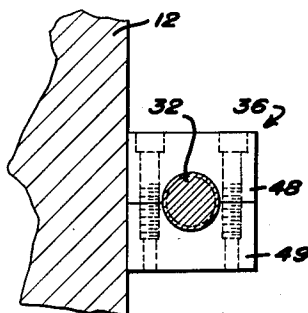


FIG. 5

INVENTOR.
ROBERT H. THOMPSON
BY

William Weigl
AGENT

Aug. 9, 1960

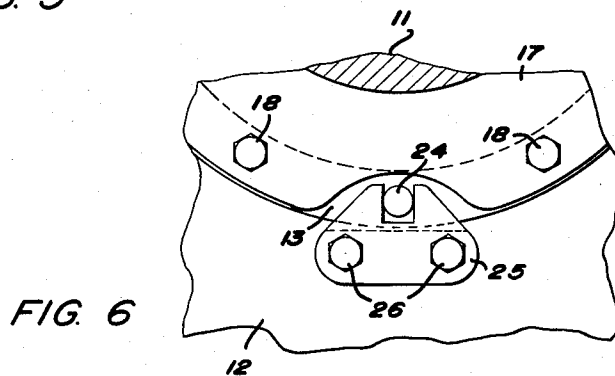
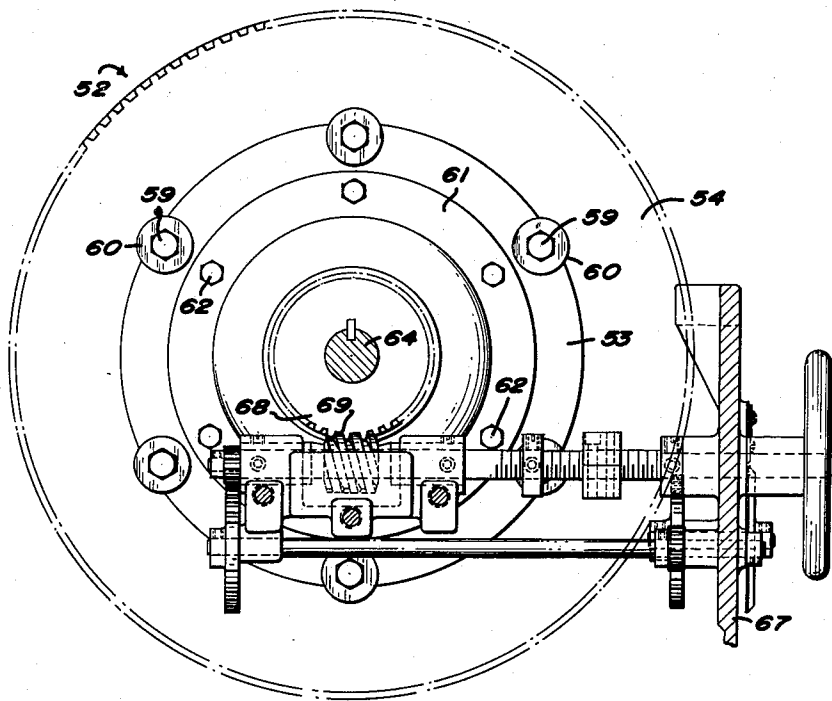
R. H. THOMPSON

2,948,216

PLATE CYLINDER REGISTER MECHANISM

Filed July 28, 1958

3 Sheets-Sheet 3



INVENTOR.
ROBERT H. THOMPSON
BY

William Weigl
AGENT

1

2,948,216

PLATE CYLINDER REGISTER MECHANISM

Robert H. Thompson, Cleveland, Ohio, assignor to Harris-Intertype Corporation, Cleveland, Ohio, a corporation of Delaware

Filed July 28, 1958, Ser. No. 751,376

7 Claims. (Cl. 101—248)

This invention relates to a registering mechanism for a plate cylinder of a multicolor printing press, particularly to a means for accomplishing both axial and circumferential register at the same end of the plate cylinder while the cylinder is rotating.

Many different types of devices for bodily moving a plate cylinder axially and circumferentially have been proposed, and several are commercially used. These registering mechanisms fall into two general categories: (1) those in which the axial or lateral adjusting mechanism is located at one end of the cylinder and the circumferential or front register adjusting mechanism is located at the opposite end of the cylinder, and (2) those in which both are located at the same end of the cylinder. The main objection to the first type of mechanism is that a pressman must often go from one side of the press to the other several times in order to properly effect each adjustment. The second type overcomes this disadvantage, but it presents another problem, the one of making the device simple and compact. This is particularly true where registration is accomplished while the plate cylinder is rotating during press operation.

It is therefore a primary object of this invention to provide a relatively simple and compact axial and circumferential adjusting mechanism for a printing press plate cylinder, both of which adjustments are located at the same end of the cylinder for ease of access by an operator and are capable of being operated while the cylinder is rotating.

Another object of the invention is to provide adjacent axial and circumferential adjusting mechanisms for a printing press plate cylinder, in which the same portions of the cylinder shaft are journaled in their bearings for all positions of adjustment.

Still another object of the invention is to provide a simple, efficient and easily operable means for adjusting a printing press cylinder axially while the cylinder is rotating.

Other objects and advantages will be apparent from the following description in which reference is made to the accompanying drawings.

According to the invention, the shaft of a plate cylinder is journaled in bearings in axially-movable, non-rotatable sleeves one of which, when moved endwise, shifts the plate cylinder axially. Additionally, a driven gear is mounted on an outwardly extending end of the shaft adjacent the sleeve which is physically moved, the gear being non-rotatable on the shaft but endwise movable relative thereto. The driven gear and its drive gear have meshing helical teeth, and means is provided for bodily moving the driven gear endwise on the shaft to cause the helical teeth to impart a rotative movement to the plate cylinder with respect to the drive gear. Both the sleeve adjustment and the gear adjustment are arranged to be operable while the plate cylinder is rotating.

In the drawings:

Fig. 1 is a fragmentary elevational view of one end of

2

a plate cylinder of a printing press, and means for adjusting the cylinder axially and circumferentially.

Fig. 2 is an end elevational view of the axial or lateral registering mechanism, and is taken substantially along lines 2—2 of Fig. 1.

Fig. 3 is an end elevational view of the circumferential registering mechanism and is taken substantially along lines 3—3 of Fig. 1.

Fig. 4 is an enlarged sectional view taken generally along lines 4—4 of Fig. 2.

Fig. 5 is an enlarged view taken along lines 5—5 of Fig. 2.

Fig. 6 is an enlarged view of a means for restraining the sleeves in which the cylinder shaft is mounted against rotation, and is taken substantially along lines 6—6 of Fig. 1.

Referring now to Fig. 1, a plate cylinder 10 has a shaft 11 journaled in a side frame 12 of a printing press. The cylinder 10 may be a printing cylinder of any one of the several different types of printing presses, it being immaterial for the purposes of this invention as to which type of process is used. Furthermore, since the purposes of shifting such a cylinder both laterally and circumferentially about its axis are well understood in the printing art, that will not be dwelled upon in great detail here. The shaft 11 may extend completely through the cylinder 10 and have its other end journaled in a side frame similar to the side frame 12, or it may comprise two separate end pieces extending outwardly of the cylinder and fixed thereto. The side frame 12 is bored to receive a sleeve 13. A cap 14, shown in greater detail in Fig. 2, may constitute a portion of the side frame journal. A combination radial and thrust anti-friction bearing 15 has its outer race tightly fitted internally in the sleeve 13 and held therein against movement by means of a collar 16 and an end plate 17 fastened to the sleeve by a plurality of screws 18. The inner race of the bearing 15 is tapered and tightly fitted onto a tapered portion of the shaft 11. It is held in place on the shaft by collars 19 and 20, a hub 21, and a plate 22 fastened to the end of the shaft 11 by means of a plurality of screws 23.

The sleeve 13 is restrained against rotation in the side frame 12 by means of a plurality of pins 24 extending from the sleeve 13 toward the cylinder 10, and a yoke-shaped restraining bracket 25 for each pin. The restraining brackets 25 are fastened to the inside of the frame 12 by means of screws 26. The sleeve 13, bearing 15, pins 24 and brackets 25 are substantially duplicated at the opposite end of the cylinder to rotatably journal the other end of the shaft 11. It will be seen, therefore, that both of the sleeves can be moved endwise in their respective bores, and with them the anti-friction bearings and the shaft will also move to shift the cylinder 10 axially. By the utilization of anti-friction bearings which are a combination radial and thrust bearing, the axial adjustment of the cylinder 10 is accomplished without setting up any harmful force except the very slight force through the bearing 15 during the axial movement. Such bearings are customarily pre-loaded and play therein is practically indiscernible, even during the adjustment.

To effect the adjustment in the lateral direction, the sleeve 13 is provided with threads 27 on the end of the sleeve extending outwardly of the side frame 12. Co-operating with these threads is a rotatable nut 28. The nut is held against the outer face of the side frame 12 by means of a plurality of gibs 29 rigidly fastened to the side frame. The gibs 29 are shown as being three in number in Fig. 2. When the nut 28 is rotated, since it is restrained by the gibs 29 against endwise movement, and since the sleeve 13 is restrained against rotative movement in the side frame 12, the sleeve 13 will move in an

3

axial direction and consequently move with it the cylinder 10.

Rotation of the nut 28 is accomplished by the mechanism shown in Fig. 2. The nut 28 has on its periphery, worm gear teeth 30 which cooperate with a rotatable worm 31 mounted on a shaft 32. The shaft is turned by means of a handwheel 33. The worm 31 is surrounded by a bracket 34 which straddles the worm to journal the shaft 32. Friction washers 35 (shown best in Fig. 4) may be located in the bracket 34 to firmly grip to shaft 32 and prevent vibration in the press from having any effect upon the shaft. The shaft 32 is threaded and carries a nut 36. The nut 36 acts as a stop by engaging one or the other of two collars 37 and 38 at its ends of travel. Such engagement prevents further rotation of the handwheel 33 and the shaft 32. As seen in Fig. 2, the nut 36 is mid-way between the two collars 37 and 38 and is therefore in its "zero" position of adjustment. The handwheel 33 may be adjusted in either direction from "zero" to shift the cylinder axially about $\frac{1}{8}$ " in each direction from zero, thereby providing an overall adjustment of $\frac{1}{4}$ ".

The extent of adjustment of the cylinder 10 axially is indicated on a dial 39 which cooperates with a stationary indicator 40. The dial 39 is preferably graduated in thousandths of an inch and is directly connected through gearing to the handwheel 33 to provide a positive indication of the extent of side adjustment. Referring again to Fig. 1, it will be seen that rotation of the shaft 32 rotates a pinion 41 which in turn rotates a larger gear 42 and a shaft 43 on which the gear 42 is mounted. One end of the shaft 43 is journaled in an ear 44 extending downwardly from the bracket 34. The end of the shaft 43 remote from the gear 42 carries a small pinion 45 which meshes with a larger gear 46. The gear 46 is carried on a short shaft 47 which supports the dial 39.

In Fig. 5 it will be seen that the nut 36 is made up of connected upper and lower halves 48 and 49 respectively, and has one side face engaging the outer surface of the side frame 12. This prevents rotation of the nut 36 and permits its travel between its limits defined by the collars 37 and 38.

Referring again to Fig. 1, it will be seen that the hub 21 is tapered internally to snugly fit a taper on the end of the shaft 11. The hub 21 is non-rotatively mounted on the shaft 11 by means of a key 50. It is further provided with external spur gear teeth 51, the purpose of which will become apparent presently. Fitted externally on the hub 21 is a driven gear 52. The gear is made up of a hub-section 53 and a ring 54 having helical gear teeth which are driven from a helical drive gear 55. The hub-section 53 has internal teeth 56 mating with the teeth 51. Together, the teeth 51 and 56 act as a spline to enable movement of the gear 52 in an axial direction relative to the hub 21 while preventing rotation between the two members. The ring 54 carrying the helical teeth is fastened securely to the hub-section 53 by means of an annular plate 57 snugly fitted on the hub 21, and a plurality of screws 58 and 59 which grip the ring 54 between the plate 57 and collars 60 surrounding the screws 59.

Means is provided for shifting the driven gear 52 endwise, and thereby, through the helical teeth on that gear and its drive gear 55, imparting a rotative movement to the plate cylinder 10 with respect to the drive gear 55. Such rotative movement will alter the front lay of the print on the plate cylinder with respect to a previous or subsequent color of the multi-color press. To effect this circumferential adjustment, the following means is provided. An end bell 61 is securely fastened to the hub-section 53 of the driven gear 52 by means of screws 62. The bell 61 is concentric with the driven gear and the shaft 11. A pair of anti-friction bearings, which when placed back-to-back, provide a combination radial and thrust bearing 63, are carried by and have their outer

4

races fixed in the bell 61. The inner races of the bearing 63 are secured to a short shaft 64 which is threaded at one end as at 65 into a nut 66. The nut 66 is fixed against rotation in a housing 67 mounted on the side frame 12. Keyed to the short shaft 64 is a worm gear 68 which cooperates with a worm 69. The worm 69 is rotated in the same fashion as worm 31. The parts for providing such rotation and providing an indication of the extent of circumferential registration are substantially the same as the mechanism described in Fig. 2 for the axial adjustment, and need not be further explained. Suffice it to say that $\frac{1}{8}$ " of circumferential or "around" registration is preferably provided in each direction, totaling $\frac{1}{4}$ " adjustment. It will be noted that the bearing 63 is secured to the short shaft 64 and to the bell 61 against relative endwise movement with respect to either of them.

The means shown in Figs. 2 and 3 for providing the separate adjustments may be considerably simplified and, if an indication is not necessary, the number of parts may be materially reduced. Furthermore, while a manual operating means has been shown, it is obvious that a reversing motor may be provided on the shaft for rotating each of the worms 31 and 69, with a control means for the motors being provided at some remote station.

Various modifications in the details of construction may be made without departing from the spirit and scope of the invention.

Having described my invention, I claim:

1. Registering mechanism for a plate cylinder of a printing press including a pair of spaced side frames, a shaft supporting said cylinder between the side frames and having ends extending outwardly from the cylinder, a pair of non-rotatable, endwise movable sleeves mounted in said side frames and journaling the shaft ends, means restraining the shaft and sleeves against relative endwise movement, a nut surrounding one of said sleeves, means restraining the nut against endwise movement, cooperating screw threads on the nut and the one sleeve, means operable during rotation of said cylinder for rotating said nut to impart an endwise movement to said sleeve and thereby to said shaft and cylinder, the shaft end adjacent said nut extending outwardly a short distance from its side frame, a helical driven gear, means mounting said gear on the shaft extension, said mounting means enabling relative endwise movement between the gear and shaft but restraining them against relative rotative movement, a helical drive gear meshing with the driven gear, and means operatively connected to and concentric with the driven gear for bodily moving it endwise to thereby impart a circumferential movement to the plate cylinder with respect to the drive gear through the helical teeth on said gears, said last named means being operable during rotation of the cylinder.

2. Registering mechanism according to claim 1 wherein said nut has worm gear teeth on its periphery, and wherein the means for rotating the nut includes a worm and an operating shaft carrying the worm, said operating shaft being closely adjacent the side frame and rotatable on an axis perpendicular to the axis of the cylinder shaft.

3. Registering mechanism according to claim 1 wherein the means for bodily moving the driven gear comprises a short shaft outwardly of and coaxial with the cylinder shaft, a combination radial and thrust bearing operatively connecting the short shaft and the driven gear, said short shaft, bearing and driven gear being capable of endwise movement as a unit, a fixed nut threaded onto the end of the short shaft remote from its bearing, and means for adjustably rotating said short shaft to move it endwise relative to the fixed nut.

4. Registering mechanism for a plate cylinder of a printing press including a pair of spaced side frames, a shaft supporting said cylinder between the side frames and having ends extending outwardly from the cylinder, a pair of non-rotatable, endwise-movable sleeves mounted in said side frames, a combination radial and thrust anti-

5

friction bearing mounted in each sleeve and journaling the shaft ends, means restraining the shaft bearings and sleeves against relative endwise movement therebetween, a nut surrounding one of said sleeves, means restraining the nut against endwise movement relative to the adjacent side frame, cooperating screw threads on the nut and the one sleeve, and means operable during rotation of said cylinder for rotating the nut to impart an endwise movement to the shaft and sleeve and thereby to said cylinder.

5. Registering mechanism according to claim 4 wherein said nut has worm gear teeth on its periphery, and wherein the means for rotating the nut includes a worm and an operating shaft carrying the worm, said operating shaft being rotatable on an axis perpendicular to the axis of the cylinder shaft.

6. Registering mechanism according to claim 5 including means indicating the extent of axial movement of the shaft, and a direct operative connection between the operating shaft and the indicating means.

7. Registering mechanism for a plate cylinder of a printing press including a pair of spaced side frames, a shaft supporting said cylinder between the side frames, a pair of non-rotatable, endwise movable sleeves mounted in said side frames and journaling the shaft therein, means restraining the shaft and sleeves against relative endwise

6

movement, a nut surrounding one of said sleeves, means restraining the nut against endwise movement relative to the adjacent frame, cooperating screw threads on the nut and the one sleeve, means operable during rotation of said cylinder for rotating said nut to impart an endwise movement to said sleeve and thereby to said cylinder, a helical driven gear, means adjacent the one sleeve mounting said gear on the shaft and enabling relative endwise movement between the gear and shaft but restraining them against relative rotative movement, a helical drive gear meshing with the driven gear, and means on that side of the press on which said gears are mounted and operatively connected to the driven gear for bodily moving the driven gear endwise to thereby impart a circumferential movement to the plate cylinder with respect to the drive gear through the helical teeth on said two gears, said last-named means being operable during rotation of the cylinder.

References Cited in the file of this patent

UNITED STATES PATENTS

2,341,202	Barber	Feb. 8, 1944
2,653,538	Pegrebrune	Sept. 29, 1953
2,677,971	Greenwood	May 11, 1954
2,775,935	Reinartz et al.	Jan. 1, 1957